Studies have shown that a womb-like light environment can reduce the levels of cortisol, promote the release of growth hormones, extend sleep duration and develop a circadian rhythm in neonatal infants. Fabric isolette covers are currently used in order to limit the amount of light stimuli that affects neonatal infants. This temporary solution is a major health hazard to the neonates due to increased risk of infection. Constant darkness is also detrimental to optical development. Therefore, in order to minimize the issues with light stimuli, caretakers and babies would benefit from a device that: reduces risk of infection, limits light stimuli efficiently, and is easily programmable to serve a vast array of functions.

Our design uses polymer dispersed liquid crystals (PDLC) film to control the amount of light permitted into the isolette to minimize health problems with light stimuli in the Neonatal Intensive Care Unit. The opacity of the film is controlled by a microcontroller (Arduino) in response to input from the caretaker (simplest) and from signals originated from the vital monitoring device connected to the isolette. The film will react to the vitals and become clear immediately in case of emergency. The final input is time which would allow for light cycling. Our design is fully adaptable to future optimization and/or inputs that could be discovered as the scientific knowledge progresses.

Keywords: Isolette, Light stimulus, Neonatal Intensive Care Unit, Premature infants.